

A2CC Q1 Exam 2 Review Key

$$1) \quad 32^x = 8$$

$$(2^5)^x = (2^3)$$

$$\frac{5x}{5} = \frac{3}{5}$$

$$\boxed{x = \frac{3}{5}}$$

$$2) \quad 6 + 9i - (-4 - 2i)$$

$$6 + 9i + 4 + 2i$$

$$\boxed{10 + 11i}$$

$$3) \quad (-3 + 6i)(3 + 5i)$$

$$-9 - 15i + 18i + 30i^2$$

$$-9 + 3i - 30$$

$$\boxed{-39 + 3i}$$

$$4) \quad x - \sqrt{x+4} = 2$$

$$+ \sqrt{x+4} \quad + \sqrt{x+4}$$

$$x = 2 + \sqrt{x+4}$$

$$\begin{array}{r} -2 \quad -2 \end{array}$$

$$(x-2)^2 = (\sqrt{x+4})^2$$

$$x^2 - 4x + 4 = x + 4$$

$$\begin{array}{r} -x \quad -4 \quad -x \quad -4 \end{array}$$

$$x^2 - 5x = 0$$

$$x(x-5) = 0$$

$$\text{reject } x=0$$

$$x=5$$

$$\text{check: } x=0$$

$$0 - \sqrt{0+4} = 2$$

$$0 - \sqrt{4} = 2$$

$$0 - 2 = 2$$

$$-2 = 2 \text{ No}$$

$$\boxed{x = 5}$$

$$\text{check: } x=5$$

$$5 - \sqrt{5+4} = 2$$

$$5 - \sqrt{9} = 2$$

$$5 - 3 = 2$$

$$2 = 2 \checkmark$$

$$5) \quad 4y^{\frac{2}{3}} - 5 = 20$$

$$+5 \quad +5$$

$$4y^{\frac{2}{3}} = 25$$

$$\begin{array}{r} 4 \quad 4 \end{array}$$

$$\left(y^{\frac{2}{3}}\right)^{\frac{3}{2}} = \left(\frac{25}{4}\right)^{\frac{3}{2}}$$

$$\boxed{y = \pm \frac{125}{8}}$$

$$6) \quad 2\sqrt{-196} - 3\sqrt{-225}$$

$$2i\sqrt{196} - 3i\sqrt{225}$$

$$2i(14) - 3i(15)$$

$$28i - 45i$$

$$\boxed{-17i}$$

$$\begin{aligned}
 7) & (1-3i)^2 + 6i \\
 & (1-3i)(1-3i) + 6i \\
 & 1 - 6i + 9i^2 + 6i \\
 & 1 - 9 \\
 & \boxed{-8}
 \end{aligned}$$

$$\begin{aligned}
 8) & \frac{\sqrt{7} + \sqrt{3}}{\sqrt{7} - \sqrt{3}} \cdot \frac{\sqrt{7} + \sqrt{3}}{\sqrt{7} + \sqrt{3}} = \frac{7 + \sqrt{21} + \sqrt{21} + 3}{7 - 3} \\
 & = \frac{10 + 2\sqrt{21}}{4} = \boxed{\frac{5 + \sqrt{21}}{2}}
 \end{aligned}$$

$$9) \boxed{-2 + 6i}$$

$$10) \frac{4}{3 + \sqrt{7}} \cdot \frac{3 - \sqrt{7}}{3 - \sqrt{7}} = \frac{12 - 4\sqrt{7}}{9 - 7} = \frac{12 - 4\sqrt{7}}{2} = \boxed{6 - 2\sqrt{7}}$$

$$11) i^{2001} \quad 4 \sqrt[500]{.25} \quad .25 \rightarrow \boxed{i}$$

$$12) \left(\frac{1}{3}\right)^{1-x} = 9$$

$$(3^{-1})^{1-x} = 3^2$$

$$\begin{array}{r}
 -1 + x = 2 \\
 +1 \quad \quad +1 \\
 \hline
 \boxed{x = 3}
 \end{array}$$

$$13) a) 4y^2 - 25x^2 \quad \text{DOTS}$$

$$\boxed{(2y + 5x)(2y - 5x)}$$

$$b) y^2 - c^2d^2 \quad \text{DOTS}$$

$$\boxed{(y + cd)(y - cd)}$$

$$c) 4x^2 + 12x + 9 \quad \text{AC}$$

$$4x^2 + 6x + 6x + 9$$

$$2x(2x + 3) + 3(2x + 3)$$

$$\boxed{(2x + 3)(2x + 3)}$$

$$d) x^2 + 3x - 18 \quad \text{AM}$$

$$\boxed{(x + 6)(x - 3)}$$

$$e) 2x^2 + 9x - 35 \quad \text{AC}$$

$$2x^2 - 5x + 14x - 35$$

$$x(2x - 5) + 7(2x - 5)$$

$$\boxed{(x + 7)(2x - 5)}$$

f) $x^6 + 8$ Sum of Cubes

$$(x^2 + 2)((x^2)^2 - 2x^2 + 2^2)$$

$$(x^2 + 2)(x^4 - 2x^2 + 4)$$

g) $x^3 + x^2 - 4x - 4$ Grouping

$$x^2(x+1) - 4(x+1)$$

$$(x^2 - 4)(x+1)$$

$$(x+2)(x-2)(x+1)$$

DOTS

h) $x^5 y^2 - x y^6$ GCF

$$xy^2(x^4 - y^4)$$

DOTS

$$xy^2(x^2 + y^2)(x^2 - y^2)$$

DOTS

$$xy^2(x^2 + y^2)(x+y)(x-y)$$

i) $-9x^3 - 3x^2 + 3x + 1$

$$-3x^2(3x+1) + 1(3x+1)$$

$$(-3x^2 + 1)(3x+1)$$

j) $x^2(x+2) - 9(x+2)$

$$(x+2)(x^2 - 9)$$

$$(x+2)(x+3)(x-3)$$

k) $5x^2 - 20$

$$5(x^2 - 4)$$

$$5(x+2)(x-2)$$

l) $3x^2 + 12x + 12$

$$3(x^2 + 4x + 4)$$

$$3(x+2)(x+2)$$

m) $27x^3 - 1$

$$(3x-1)((3x)^2 + (3x)(1) + 1^2)$$

$$(3x-1)(9x^2 + 3x + 1)$$

n) $2x^3 - 3 + x^2 - 6x$

reorder

$$2x^3 + x^2 - 6x - 3$$

$$x^2(2x+1) - 3(2x+1)$$

$$(2x+1)(x^2 - 3)$$

$$14) (12x^4y^2)^2 \left(\frac{x^5y}{z}\right)$$

$$(144x^8y^4) \left(\frac{x^5y}{z}\right)$$

$$\frac{144x^{13}y^5}{z} = \boxed{72x^{13}y^5}$$

$$15) (rs)^3(2s)^{-2}(4r)^4$$

$$\frac{r^3s^3 \cdot 4^4r^4}{(2s)^2} = \frac{256r^7s^3}{4s^2} = \boxed{64r^7s}$$

$$16) \frac{a^{-3}b^4}{a^{-5}b^5} = \boxed{\frac{a^2}{b}}$$

$$17) (-32)^{\frac{2}{5}} = \sqrt[5]{(-32)^2} = \boxed{4}$$

$$18) \left(\frac{25}{64}\right)^{-\frac{3}{2}} = \left(\frac{64}{25}\right)^{\frac{3}{2}} = \left(\sqrt{\frac{64}{25}}\right)^3 = \left(\frac{8}{5}\right)^3 = \boxed{\frac{512}{125}}$$

$$19) a^{-\frac{2}{5}} = \frac{1}{a^{\frac{2}{5}}} = \boxed{\frac{1}{\sqrt[5]{a^2}}}$$

$$20) \sqrt[3]{81x^8y^4}$$

$$\sqrt[3]{27x^6y^3} \quad \sqrt[3]{3x^2y}$$

$$\boxed{3x^2y \sqrt[3]{3x^2y}}$$

$$21) 2\sqrt{8x^3} + 3x\sqrt{32x} - x\sqrt{18x}$$

$$2\sqrt{4x^2}\sqrt{2x} + 3x\sqrt{16}\sqrt{2x} - x\sqrt{9}\sqrt{2x}$$

$$2 \cdot 2x\sqrt{2x} + 3x(4)\sqrt{2x} - x(3)\sqrt{2x}$$

$$4x\sqrt{2x} + 12x\sqrt{2x} - 3x\sqrt{2x}$$

$$\boxed{13x\sqrt{2x}}$$

$$22) \sqrt{x+16} - x = 4$$

$$(\sqrt{x+16})^2 = (4+x)^2$$

$$x+16 = 16+8x+x^2$$

$$0 = x^2+7x$$

$$0 = x(x+7)$$

$$\begin{array}{l|l} x=0 & x=-7 \\ \checkmark & \times \\ & \text{reject} \end{array}$$

$$\boxed{x=0}$$

$$23) 2x = 3\sqrt{x+3} + 3$$

$$(2x-3)^2 = (3\sqrt{x+3})^2$$

$$4x^2-12x+9 = 9(x+3)$$

$$4x^2-12x+9 = 9x+27$$

$$-9x-27 \quad -9x-27$$

$$4x^2-21x-18 = 0$$

$$4x^2-24x+3x-18 = 0$$

$$4x(x-6)+3(x-6) = 0$$

$$(4x+3)(x-6) = 0$$

$$\begin{array}{l|l} 4x+3=0 & x=6 \\ 4x=-3 & \checkmark \\ x=-\frac{3}{4} & \end{array}$$

$$\boxed{x=6}$$

24) $4\sqrt{x}$ ⊛ Think $\frac{\text{Power}}{\text{Root}}$

25) $(3x)^{\frac{1}{4}}$

26) $(w+1)^{\frac{3}{2} \cdot \frac{2}{3}} = 64^{\frac{2}{3}}$
 $w+1 = 16$
 $\quad \quad -1 \quad -1$

 $w = 15$

27) $\frac{2x^{\frac{2}{5}}}{2} = \frac{32}{2}$ ← even
odd
 $x^{\frac{2}{5}} = 16$
 $x^{\frac{2}{5} \cdot \frac{5}{2}} = 16^{\frac{5}{2}}$
 $x = \pm 1024$

28) $3y^{\frac{1}{3}} - 2 = 4$
 $\quad \quad +2 +2$

 $3y^{\frac{1}{3}} = \frac{6}{3}$
 $y^{\left(\frac{1}{3} \cdot \frac{3}{1}\right)} = \frac{2^3}{1}$
 $y = 8$

29) $16^{x-1} = 8^x$
 $(2^4)^{x-1} = (2^3)^x$
 $4x-4 = 3x$
 $\quad -4x \quad -4x$

 $-4 = -x$
 $x = 4$

30) $81^{x+2} = 27^{5x+4}$
 $(3^4)^{x+2} = (3^3)^{5x+4}$
 $4x+8 = 15x+12$
 $\quad -4x-12 \quad -4x-12$

 $-4 = 11x$
 $x = -\frac{4}{11}$

31) $2^{x+1} = 8$
 $2^{x+1} = 2^3$
 $3 = x+1$
 $2 = x$

$$32) \left(\frac{1}{27}\right)^{-x} = 9^{x+2}$$

$$27^x = 9^{x+2}$$

$$(3^3)^x = (3^2)^{x+2}$$

$$3x = 2x + 4$$

$$\boxed{x=4}$$

$$33) \sqrt{x+11} + 1 = x$$

$$(\sqrt{x+11})^2 = (x-1)^2$$

$$x+11 = x^2 - 2x + 1$$

$$0 = x^2 - 3x - 10$$


$$(x-5)(x+2)$$

$$\boxed{x=5} \quad | \quad x=-2 \text{ reject.}$$

$$34) 10 + \sqrt{x+2} = 8$$

$$\begin{array}{r} -10 \qquad \qquad -10 \\ \hline \end{array}$$

$$\sqrt{x+2} = -2$$


 $\boxed{\text{No Solution}}$